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E-mail traffic in mobile communications system

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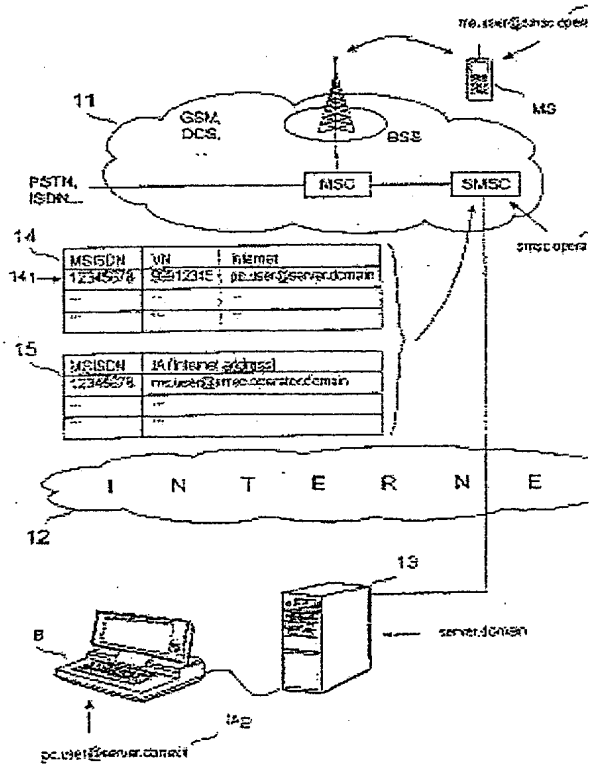
Abstract of **TW400489**

The addresses of a mobile station (MS) and a second party (B) connected to the Internet (12) are converted in such a way that a short message service centre (SMSC) receives an allocation request (2-1) from a mobile station for allocating a virtual number (VN) to a combination comprising the address (IAB) of a second party preferably also a mobile station identifier. The SMSC sends a reply (2-2) to the mobile station, the reply indicating the allocated virtual number (VN). The mobile station (MS) transmits a short message (2-9) to the virtual number. The SMSC forms an Internet address (IAB) of the second party (B) on the basis of the virtual number (VN) and the allocation request (2-1) and sends to the Internet address an e-mail message (2-10) whose text part corresponds to the text part of the short message. The B party can reply (2-11) by using the reply function of the e-mail, which exchanges the sender for the recipient. The B party can also use (2-13) the ISDN number of the mobile station. In both cases (2-12, 2-14) a virtual number (VN) is sent to the mobile station (MS), the number indicating the sender to the user of the mobile station.



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Description of correspondent: **US6587693**

[0002] This application is the national phase of international application PCT/FI98/00675 filed Aug. 1998, which designated the U.S.

BACKGROUND ART

[0003] The invention relates to transmitting electronic mail (e-mail) between the Internet and a mobi station.

[0004] The invention is described in connection with a GSM system (or its derivatives, such as a DCS/GSM1800), at first with reference to FIG. 1. The user of a mobile station (MS) communicates Mobile Switching Centre MSC through a Base Station Subsystem BSS, and with other mobile statio through the MSC, or with terminals of a wired network through a Public Switching Telephone Netw PSTN. A Short Message Service Centre SMSC through which text messages, i.e. short messages, ca transmitted and received, is connected to the GSM system.

[0005] The use of Internet in transmitting e-mail is rapidly becoming popular. FIG. 1 illustrates an e server 13 connected to the Internet 12, and a personal computer B connected to this server (e.g. thro local area network). (Reference B refers to a second party of a call, i.e. what is known as subscriber light and easily portable mobile station would in many respects be an ideal terminal for using e-mail

[0006] A problem is the incompatibility between the short message function of the GSM system and Internet concerning e-mail addresses. As is known, in the GSM system short messages are transmitt using the recipient's ISDN number. The length of a short message is limited to 160 characters. The recipient's ISDN number is not included in these 160 characters. In the Internet the e-mail addresses the following format: "user@server.domain". Here the "user" typically stands for a person's first nan surname, the "server" consists of the name of a company or an organization and the "domain" repres the naming domain of servers indicating the type of organization (for example ".com", "org" etc) or country ID (for example ".fi", ".de", etc). In FIG. 1 such Internet addresses are for instance the addre the short message service centre SMSC IASMSC "smsc.operator.domain", the address of the e-mail 13 "server.domain" and computer B in its domain and having the address IAB "pc.user@server.dom

[0007] Using Internet addresses in connection with a short message function causes several problem prior art methods allow such an address to be transmitted only as a part of the short message content would use the maximum length of the short message (as much as tens of charactLers), which in all is characters. In addition, the input of long user IDs and special characters (such as @) from a mobile s keyboard is known to be difficult. Furthermore, the address books, or address lists, of current mobile stations are not designed to store Internet-formatted e-mail addresses. A further problem is that the u computer B cannot use the reply function of the e-mail program, as the identifier of the mobile static and the Internet address of computer B are incompatible.

BRIEF DESCRIPTION OF THE INVENTION

[0008] An intermediate object of the invention is to create a method and an equipment for implemen the method of converting the addresses between the short message function of a mobile communicat system and the Internet. The intermediate object is achieved with a method and a system which are characterized in what is disclosed in the independent claims. A main object of the invention and pre embodiments of the intermediate object are achieved with the methods and systems that are disclose the dependent claims.

[0009] The idea of the invention is that a virtual number is reserved for the Internet-format e-mail ac It is called a virtual subscriber number (a virtual number VN for short), as it is not directly associate a physical subscriber or a terminal. The virtual subscriber number is converted into an Internet addre the fixed part of the mobile communication system, most conveniently in the short message service

[0010] It is highly preferable that the virtual numbers are allocated to combinations comprising both of the mobile station (MSISDN) and the Internet address of subscriber B. It is thus possible to use th virtual numbers for different mobile stations, a few characters sufficing as the length of an individua virtual number. If the length of a virtual number is three digits, each mobile station can have 1000 st combinations at its disposal. Three digits (and a possible space or another separator in the mobile terminating messages) do not take up much of the maximum length of the short message. If several stations use the same virtual number, the right recipient can in any case be deduced, as two identical combinations cannot exist. Another advantage of this kind of combinations is that they help verifyin ID of the sender of the message. An unauthorized person cannot exploit a virtual number possibly k to him.

[0011] The invention provides a flexible mechanism for creating addresses between the short messa function of a mobile communication system and the Internet. A mechanism as described in the inver

takes up only a very small part of the maximum length of a mobile terminating short message, i.e. th number of characters equalling the length of the virtual number. An addressing mechanism of the in does not take up any of the length of a mobile originating short message. Furthermore, the addressin mechanism of the invention is fully compatible with current mobile stations and their address books.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] In the following, the invention will be described in greater detail in connection with the prefe embodiments and with reference to the accompanying drawings, in which

[0013] FIG. 1 shows a diagram of telecommunication system and tables included in a short message service centre of the invention; and

[0014] FIGS. 2 and 3 show e-mail transmission in accordance with the invention between a mobile s and a B party.

DETAILED DESCRIPTION OF THE INVENTION

[0015] Referring to FIGS. 1 and 2, the examples and the Figures assume that the subscriber number mobile station MS is "12345678", the Internet address IAB of the B party is "pc.user @server.domai virtual number VN allocated to this combination is "99912345", and the Internet address IASMSC o short message service centre SMSC is "smsc.operator.domain" and its command port is "99999999" short message service centre SMSC and the server 13 of subscriber B may naturally be in different domains (i.e. their domain names may be different). In FIGS. 2 and 3, the underlined numbers (9999 and 99912345) function as short message addresses, and are not part of the short message proper (th not consume its maximum net length).

[0016] Furthermore, for the sake of simplicity and clarity, it is assumed in the following examples th functionality of the invention is integrated into the short message service centre SMSC of the mobile communications system. Corresponding functions can naturally be implemented in one or several se network elements that are functionally connected to the short message service centre. Such a supplementary network element can be more advantageous if the network comprises a short message service centre previously supplied by one provider, and the intention is to add additional features sup by another provider. In this case a short message service centre signifies the particular combination i by the actual short message service centre and the changes of the invention associated with the separ network elements.

[0017] Steps 2-1 to 2-8 show how the address book can be managed. Table 14 for linking the ISDN number of the mobile station MS, the virtual number VN and the Internet address of the second part associated with the short message service centre SMSC. Reference 141 illustrates one such combina step 2-1 the mobile station MS requests the short message service centre SMSC to allocate a virtual number for the Internet address of the B party. The allocation request is a short message transmitted port of the short message service centre SMSC (to number 99999999). This short message comprise Internet address IAB of the B party (here pc.user@server.domain). In step 2-2 the short message ser centre SMSC allocates a virtual number VN (here 99912345) to the pair formed by B and the mobile station MS, and enters the information in table 14 (here on line 141). The short message service cent SMSC sends this virtual number VN and (as a precaution) the Internet address IAB of B (here pc.user@server.domain) to the mobile station. If the short message service centre SMSC is not previ familiar with B's address, it allocates an unused number to B. The mobile station is now able to use t virtual number 99912345 for indicating the B party concerned.

[0018] Steps 2-3 and 2-4 show how the user of a mobile station MS can modify the Internet address associated with a virtual number VN. In step-2-3 the mobile station MS requests the short message s centre SMSC to link the virtual number 99912345 and the Internet address pc.user@server.domain c step 2-4 the short message service centre confirms having done so.

[0019] In step 2-5 the mobile station inquires the short message service centre to whom a particular subscriber number has been allocated. In its simplest form the inquiry is a virtual number and a char indicating an inquiry, most preferably a question mark. The short message service centre replies in s 6.

[0020] In step 2-7 the mobile station asks the short message service centre to delete the Internet addı associated with the virtual number 99912345. The simplest way to do this is for an empty Internet ac to follow the virtual number. In step 2-8 the short message service centre confirms having done so. T

virtual number is then free to be used for other purposes. (In a real situation an address naturally has deleted last, which is why the corresponding arrows in FIG. 2 have been drawn in dashed lines.)
[0021] Steps 2-9 to 2-16 show the actual e-mail traffic so that in the steps 2-9 to 2-12 the mobile stat MS transmits a message to which subscriber B replies, and, correspondingly, in the steps 2-13 to 2-1 subscriber B transmits a message to which the mobile station MS replies. In order to illustrate the description, a typical example of the use of e-mail and short messages is described, in which the use mobile station MS wishes to inform his secretary (B) that he will be late for a scheduled meeting. Th secretary first replies that she will have to reschedule the meeting for the following day. Later the se sends a new e-mail message, in which she informs the precise time of the meeting. Finally, the user mobile station MS sends a reply to this message.
[0022] In step 2-9 the mobile station MS transmits e-mail to subscriber B. This is performed by transmitting a short message whose contents correspond to the contents of an intended e-mail. The s message is transmitted to the virtual number VN (here 99912345) that the short message service cen step 2-2) allocated to the pair formed by subscriber B and the mobile station. In step 2-10 the short message service centre SMSC retrieves from table 14 the Internet address of the B party correspondi the mobile station MS concerned and the virtual number 99912345. It then forms the e-mail messag transmits it to B for example in the following manner. In order to form a sender field ("from") for th mail, the virtual number concerned 99912345 is joined to the domain of the Internet address IASMS the short message service centre SMSC, here smsc.operator.domain. The address thus becomes: 99912345@smsc.operator.domain. The recipient ("to") is the Internet address pc.user@server.domai the B party. The subject of the e-mail message may indicate that a short message is concerned. The contents of the e-mail message will thus be the contents of the short message.
[0023] In step 2-11 B replies to the mobile station MS. The reply is initiated by sending an e-mail m to the Internet address of the short message service centre SMSC. As a reply message is concerned, sender is the same as the recipient in step 2-10 and vice versa. B can thus use the reply function of th mail program. The subject of the message may indicate that the subject concerns a short message. Tl reply written by subscriber B is the contents of the message. In step 2-12 the short message service c retrieves from table 14 the number of the mobile station MS (here 12345678) corresponding to the v number VN (here 99912345) of the mobile station and to the Internet address of the sender (here pc.user@server.domain). The short message service centre SMSC transmits to this number a short m comprising the virtual number 99912345 and the text part of the e-mail message received in the prev step. By means of the virtual number and the address book, the user of the mobile station MS can, if necessary, deduce who the sender of the message is. If the combined length of the virtual number an reply message exceeds the maximum length of the short message (160 characters), the excess can be transmitted in a second short message.
[0024] In step 2-13 B has organized a meeting for the following day at 15.00 hours and wishes to kn the time is suitable for the user of the mobile station MS. B sends an e-mail message. In this case B not use the virtual number 99912345 allocated by the short message service centre (as B does not re an e-mail but sends a new message and as it is more convenient for B to use the telephone book of th mail program for obtaining the mobile station MS number 12345678). The recipient's address is forr joining the number 12345678 to the domain of the Internet address smsc.operator.domain of the sho message service centre SMSC (i.e. keying in 12345678@smsc.operator.domain). The subject field c "mail". In the message a meeting is proposed for the following day at 15.00 hours and a confirmatio requested. In step 2-14 the short message service centre searches from table 14 the virtual number 99912345 corresponding to the number 12345678 of the mobile station and the Internet address pc.user@server.domain of the sender B. The short message service centre SMSC then forms the sho message by joining the virtual number concerned 99912345 with the text part of the e-mail message (received in step 2-13). By means of the virtual number the user of the mobile station MS is able to conclude who the sender is. In steps 2-15 and 2-16 the user of the mobile station MS confirms that th of the meeting is convenient. Technically these steps correspond to steps 2-9 and 2-10, explained ab
[0025] It is assumed in step 2-14 that the virtual number concerned was previously allocated to this recipient pair. If this is not the case, the short message service centre SMSC is able to allocate an av number. Consequently, the process could also begin with a message subscriber B sends to the mobil station MS. In this case, if the aim is to maximize the information obtained by the user of the mobile station, the short message service centre SMSC sends to the mobile station the e-mail address and th

virtual number VN allocated to subscriber B. The short message service centre is able to send this pi information as a separate short message corresponding to the message 2-2 (or 2-6) described above. Alternatively, the e-mail address of subscriber B and the virtual number VN allocated to subscriber I be attached to the same e-mail message carrying the actual text part, if their combined length does n exceed the maximum length of a short message. If, in turn, the aim is to minimize message traffic, a short message can be avoided by the short message service centre sending only the virtual number V has allocated. The message is similar to the message 2-14 explained above, but the virtual number V (99912345) is new to the user of the mobile station. If the text part of the message does not indicate the sender is, the user of the mobile station can send an inquiry in a similar way as explained above i connection with message 2-5.

[0026] Referring now also to FIG. 3, an extended embodiment of the invention is described, in whic the user of a mobile station MS can be identified on the basis of an Internet-format ID (an Internet address). In addition, table 15 which links the ISDN number of the mobile station MS and the Intern address IAMS of the same mobile station, has been associated with the short message service centre SMSC. In step 3-1 the mobile station MS transmits to the command port 99999999 of the short mess service centre a short message comprising the number of the mobile station 12345678 and a name se by its user; "ms.user" in this example. In step 3-2 the short message service centre SMSC stores this information in table 15 and sends a reply confirming that it has linked the number 12345678 and the Internet-formatted name ms.user. A complete Internet address is obtained by keying in the name "m selected by the user of the mobile station in the domain of the Internet address of the short message centre, i.e. ms.user@smsc.operator.domain. If the name ms.user is reserved for another mobile static short message service centre cannot allocate it to this particular mobile station. The short message se centre informs about this for example by sending the old Internet-formatLted address of the mobile s concerned, if such an address exists. If not, the short message service centre can reply by sending the number 12345678 of the mobile station only.

[0027] In steps 3-3 and 3-4 the user of the mobile station MS transmits a message to subscriber B, w sends a reply in step 3-5 and 3-6. As regards the contents, these steps correspond to steps 2-9 to 2-1 However, there is a difference in addressing these messages. Having received a short message in ste the short message service centre SMSC searches table 15 to find out if an Internet address has been allocated to the transmitting mobile station MS. In this case an address has been allocated, and the sl message service centre finds the name ms.user next to the number 12345678 in table 15 and uses the Internet address ms.user@smsc.operator.domain of the mobile station MS in the sender field ("from' step 3-4.

[0028] In the reverse direction, in steps 3-5 and 3-6, the SMSC again uses table 15 and detects that t ISDN number 12345678 corresponds to the Internet address ms.user@smsc.operator.domain. The S then (for the comfort of the user of the mobile station MS) again uses table 14 and detects that on lin the virtual number 99912345 corresponds to the sender-recipient pair concerned and attaches this vi number to the short message. On the basis of the virtual number (and the address book) the user of t mobile station MS is able to deduce the sender of the message.

[0029] A conventional short message service centre is able to transmit and receive short messages b a short message service centre and a mobile station through a mobile communication system. The sh message service centre in accordance with the invention is further expected to possess the ability:

[0030] to send and receive e-mail messages between the short message service centre and subscribe through the Internet;

[0031] to identify the allocation request for the virtual number transmitted by the mobile station and comprising the Internet address of subscriber B;

[0032] to allocate the virtual number VN to subscriber B as indicated by the allocation request and t inform the mobile station about the allocated virtual number;

[0033] to identify a short message transmitted by the mobile station to the virtual number VN conce and to send the text part of the short message as e-mail through the Internet to the subscriber B, to w the virtual number VN in question is allocated.

[0034] In this context a 'virtual number' (VN) refers to a number which has not directly been connec a subscriber. 'Allocation' means that a virtual number is reserved among available numbers and is st memory in such a manner that the virtual number in question corresponds to subscriber B as mentio the allocation request. It is highly advantageous that the virtual numbers be stored as combinations

comprising the ID (MSISDN) of the mobile station, the e-mail address of subscriber B and the virtu number. Consequently, the same virtual numbers can be used for different mobile stations. If several mobile stations use the same virtual number, the correct recipient can in any case be deduced as it is possible for two similar combinations to exist. Another advantage of such combinations is that they verifying the ID of the sender of the message. An unauthorized person cannot exploit a virtual numb possibly known to him. A third advantage is that the virtual numbers can only be a few characters lo
[0035] In accordance with a preferred embodiment of the invention, the combinations further compr free-form text field, which may include for example a person's plain-language name. In some syster e-mail addresses can be only eight characters long, an addition of a plain-language name thus increa the user-friendliness and reducing the danger of confusion.
[0036] For the purpose of an extension explained in connection with FIG. 3, the short message servi centre is further expected to possess the ability:
[0037] to identify the allocation request (3-1) of a user name (ms.user) transmitted by the mobile sta MS;
[0038] to allocate the user name (ms.user) to the mobile station that sent the allocation request and t inform the mobile station about the success or failure of the allocation;
[0039] to send the short message transmitted by the mobile station as an e-mail message to the B par whom the virtual number concerned (99912345) is allocated to, in such a manner that the e-mail in question comprises the user name (ms.user) allocated to the mobile station MS concerned in the dom the Internet address of the short message service centre (i.e.: ms.user@smsc.operator.domain);
[0040] to receive and to identify an e-mail message sent to the Internet address allocated to the mobi station and to send its text part as a short message to the mobile station MS concerned, preferably in way that the short message comprises the virtual number VN (here 99912345) allocated to the comb of the mobile station MS and the B party.
[0041] These changes can be implemented by reasonably simple software changes to a known short message service centre, which is connected to the Internet and which is given the Internet address IASMSC. The short message service centre is provided with table 14. In the case of mobile originati messages, the Internet address IAB of subscriber B is retrieved from table 14 on the basis of the ISD number and the virtual number VN of the mobile station. In the case of mobile terminating message ISDN number of the mobile station is retrieved from table 14 on the basis of the virtual number VN the Internet address IAB of subscriber B. All columns of the table thus function as search basis, and therefore preferable to index all columns of table 14. Similarly in table 15, retrieval is also performe both directions, and it is therefore preferable to index both its columns.
[0042] Another aspect of the invention shows that the invention provides a network element of a mo communication system, most appropriately a short message service centre, that has been adapted to a protocol between a mobile station MS and a second party (B), the protocol comprising:
[0043] an allocation request for a virtual number, transmitted by the mobile station (MS) to allocate virtual number (99912345) to the combination comprising the ID (12345678) of the mobile station concerned and the ID (pc.user@server.domain) of the second party shown by the allocation request;
[0044] a reply to the allocation request for a virtual number sent to the mobile station (MS) in such a manner that the reply indicates whether the allocation of the virtual number was successful or not, a is successful, the allocated virtual number (VN).
[0045] For sending messages from a mobile station to B party the protocol comprises:
[0046] a first short message transmitted by the mobile station (MS), having the virtual number VN a address and comprising a first text part; and
[0047] a first e-mail message, which is responsive to the first short message and which is to be sent t B party, and whose:
[0048] sender field indicates the short message service centre SMSC and at least indirectly the mobi station MS concerned;
[0049] recipient field indicates the B party, whose address is determined on the basis of the virtual n (VN), which is the address of the first short message, and the allocation request;
[0050] text part substantially corresponds to the text part of the first short message.
[0051] For replying from B party to the mobile station MS the protocol comprises:
[0052] a second e-mail message which comprises:
[0053] a sender field indicating the B party;

[0054] a recipient field indicating the short message service centre SMSC and at least indirectly the station MS; and
[0055] a second text part; and
[0056] a second short message, the receiving mobile station MS of which is determined at least indi on the basis of the recipient field of the second e-mail message; and which short message substantial comprises said second text part and preferably also the virtual number (VN) allocated to the combin concerned.
[0057] All messages of said protocol either originate from or terminate at the short message service SMSC. In the case shown in FIG. 2, the fact that the second e-mail message indirectly indicates the station, means that the recipient field comprises, in addition to the address of the SMSC, either the n of the mobile station (12345678) or the virtual number (99912345) allocated to the combination concerned. For the purpose of the extension described in connection with FIG. 3, the protocol furthe comprises:
[0058] an allocation request 3-1 for an Internet address sent by the mobile station MS for allocating Internet address IAMS (here: ms.usere@smsc.operator.domain) to the mobile station concerned; and
[0059] a reply 3-2 to the allocation request for the Internet address, sent to the mobile station MS, th indicating whether the allocation was successful or not.
[0060] Further in the case illustrated in FIG. 3, the sender field of the first e-mail message 3-4 and th recipient field of the second e-mail message 3-5 comprise the Internet address (ms.user@smsc.operator.domain) of the mobile station MS.
[0061] To those skilled in the art it is obvious that the basic idea of the invention can be implemente many different ways. Thus, numeric IP addresses could for example be used instead of Internet addr This would be somewhat faster, as a retrieval from a domain name server would no longer be neede Remembering IP addresses is, however, difficult, which is why the use of Internet addresses is prefe short message service centre in accordance with the invention can be one network element, in which functions are integrated, or it can be a conventional short message service centre, to which a separat expansion part has been connected. The invention and its embodiments are thus not restricted to the examples above but can be modified within the scope of the claims.

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Claims of correspondent: **US6587693**

What is claimed is:

[0062] 1. A method of matching the addresses of a first party, namely a mobile station connected to mobile communication system supporting a short message function, and a second party connected tc (Internet protocol) network, the method comprising:connecting a network element supporting the sh message function of the mobile communication system to the IP network and assigning an IP netwo address to the network element; and the network element receiving an allocation request for a virtua number from the mobile station for allocating a virtual number to a combination comprising at least address of the second party indicated in the allocation request; and in response to the allocation requ the virtual number, the network element sending a reply to the mobile station, the reply indicating th allocated virtual number if the reservation is successful.

[0063] 2. A method as claimed in claim 1, wherein, in the case of a message transmitted from the m station to the second party:the mobile station transmitting to the network element a first short messa which is addressed to the virtual number allocated to the combination and which comprises a first te and the first network element forming and IP network address of the second party on the basis of the information included in the virtual number and the allocation request, and sending to the IP network address of the second party a first e-mail message, the text part of which substantially corresponds tc first text part.

[0064] 3. A method as claimed in claim 1, wherein, in the case of a message sent by the second party terminating in the mobile station:the second party sending to the network element a second e-mail message, a recipient field of which comprises the virtual number, and which second e-mail message includes a second text part; and the network element forming an identifier for the mobile station on t basis of the information included in the virtual number and in the allocation request, and sending a s short message to the mobile station comprising as much as possible of the second text part.

[0065] 4. A method as claimed in claim 3, wherein the text part of the second short message also comprises the virtual number.

[0066] 5. A method as claimed in claim 1, wherein in the case of a message sent from the second pa the mobile station:the second party sending to the network element a third e-mail message, a recipie of which comprises the identifier of the mobile station and which third e-mail message comprises a t party text; and if a virtual number has been allocated to the combination comprising the address of tl second party, the network element transmitting to the mobile station a third short message, the text p which comprises the virtual number and as much as possible of the third party text.

[0067] 6. A method as claimed in claim 1, wherein the combination also comprises an identifier of tl mobile station.

[0068] 7. A method as claimed in claim 6, wherein the combination also comprises a free-form text :

[0069] 8. A method as claimed in claim 1, further comprising:the mobile station sending to the netw element an allocation request for allocating an IP network address to the mobile station; and in respc the allocation request, the network element sending to the mobile station a reply, which indicates wh the allocation of the IP network address is successful or unsuccessful; and that a sender field of said mail message and a recipient field of the second e-mail message comprise the IP network address all to the mobile station.

[0070] 9. A network element of a mobile communication system, which is adapted to support a prot for sending messages between a mobile station and a second party through the network element, wherein:the network element is connectable to the IP network; and the protocol comprises: an alloca request for a virtual number, transmitted by the mobile station, in order to allocate a virtual number i combination comprising at least an address of a second party indicated by the allocation request; a re the allocation request for the virtual number, sent to the mobile station, the reply indicating whether reservation of the virtual number is successful or unsuccessful, and if it is successful, the virtual nun allocated.

[0071] 10. A network element as claimed in claim 9, wherein, in order to support message traffic fro mobile station to the second party the protocol further comprises:a first short message transmitted by mobile station, having the virtual number as its address and comprising a first text part; and a first e- message, which is responsive to the first short message and which is to be sent to the second party, tl e-mail message comprising: a sender field indicating the network element and at least indirectly the station concerned; a recipient field indicating said second party the address of which is determined o basis of the virtual number that is the address of the first short message and the allocation request; a part substantially corresponding to the text part of the first short message.

[0072] 11. A network element as claimed in claim 10, wherein, in order to support message traffic fr second party to the mobile station the protocol further comprises:a second e-mail message comprisir sender field indicating the second party; a recipient field indicating the network element and at least indirectly the mobile station; a second text party; and a second short message, the receiving mobile s of which is determined on the basis of the information included in the recipient field of the second e- message and in the allocation request; the second short message substantially comprising said secon part and preferably also the virtual number allocated to the combination.

[0073] 12. A network element as claimed in claim 10, wherein the sender field of the first e-mail me comprises the virtual number which is the address of the first short message.

[0074] 13. A network element as claimed in claim 11, wherein the protocol further comprises:a seco allocation request transmitted by the mobile station for allocating an IP network address to the mobi station; and a reply to the second allocation request, sent to the mobile station, the reply indicating w the allocation of the IP network address was successful or unsuccessful; and that the sender field of t first e-mail message and the recipient field of the second e-mail message comprise the IP network ac allocated to the mobile station.

[0075] 14. A network element as claimed in claim 9, wherein the combination also comprises an ide of the mobile station transmitting the allocation request.

[0076] 15. A network element as claimed in claim 9, wherein the network element is a short messag service centre.

[0077] 16. A network element as claimed in claim 9, wherein the network element comprises a short message service centre and a separate extension part functionally attached to the short message servi centre.

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[54]名 稱：行動通信系統之電子郵件業務

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[57]申請專利範圍：

1.一種在支援短信息功能之一行動通信系統 (11)中，將一行動台 (MS)之位址與連接至網際網路 (12)之一第二方 (B)加以相配之方法，其特徵為：

・將支援行動通信系統短信息功能之一種網路元件 (SMSC) 連接到網際網路 (12)並賦予一網際網路位址 (IA_{SMSC})；以及

・該網路元件 (SMSC)從行動台 (MS)接收對於一虛擬號碼之分配請求 (2-1， 2-3)，加以分配一虛擬號碼 (VN)給至少包含分配請求中所表示之第二方 (B)之位址 (IA_B)的一項組合 (14_1)；以及

・為回應對虛擬號碼之分配請求，該網路元件 (SMSC) 傳送一回覆 (2-2，2-4)給行動台 (MS)，如果保留成功的話，該回覆即表示所分配之虛擬號碼 (VN)。

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2.如申請專利範圍第 1項之方法，其特徵為，在信息是由行動台 (MS)傳送至第二方 (B)之情況下：

・行動台 (MS)將一第一短信息加以傳送至該網路元件 (SMSC)(2-9， 2-15，3-3)，此短信息之傳送位址為分配給該組合 (14_1)之虛擬號碼 (VN)，且它含第一文字部分；以及

・根據該虛擬號碼 (VN)與該分配請求 (2-1， 2-3)中所包含之資訊，第一網路元件 (SMSC)形成第二方 (B)之一網際網路位址 (IA_B)，並將第一電子郵件信息加以傳送至第二方之網際網路位址，第一電子郵件之文字部分實質上等於該第一文字部分。

3.如申請專利範圍第 1項之方法，其特徵為，在信息是由第二方 (B)加以傳送並

終止於行動台 (MS)之情況下：

・第二方 (B)將一第二電子郵件信息 (2-11)加以傳送至該網路元件 (SMSC)，此電子郵件信息之受信者欄位包含該虛擬號碼 (VN)，並包含一第二文字部分；以及

・根據該虛擬號碼 (VN)與該分配請求 (2-1， 2-3)中所包含之資訊，網路元件 (SMSC)形成一針對行動台 (MS)之識別記號，並將儘可能多包含一點該第二文字部分之第二短信息 (2-12)加以傳送至行動台 (MS)。

4.如申請專利範圍第 3項之方法，其特徵為，該第二短信息之文字部分也包含該虛擬號碼 (VN)。

5.如申請專利範圍第 1項之方法，其特徵為，在信息是由第二方 (B)加以傳送至行動台 (MS)之情況下：

・第二方 (B)將一第三電子郵件信息 (2-13)加以傳送至該網路元件 (SMSC)，此電子郵件信息之受信者欄位包含有關行動台 (MS)之識別記號並包含一第三文字部分；以及

・如果已經分配一虛擬號碼 (VN)給包含該第二方 (B)位址之組合 (14_1)，則該網路元件 (SMSC) 將一第三短信息 (2-14)加以傳送至行動台 (MS) ，此短信息之文字部分包該虛擬號碼 (VN)以及儘可能多包含一點該第三文字部分。

6.如申請專利範圍第 1至第 5項中任何一項之方法，其特徵為，該組合 (14_1)也包含有關行動台 (MS)之一識別記號。

7.如申請專利範圍第 6項之方法，其特徵為，該組合 (14_1)也包含一自由格式之文字欄位。

8.如申請專利範圍第 1項之方法，其特徵為；

・行動台 (MS)傳送給網路元件一請求一個網際網路位址 (IA_{MS})之分配請求 (3-1)到該行動台 (MS)，以及

・為回應該分配請求，該網路元件 (SMSC)傳送一回覆 (3-2)給行動台 (MS)，此回覆表示網際網路位址 (IA_{MS})之分配是否成功；以及

・該第一電子郵件信息 (3-4)之送信者欄位與該第二電子郵件信息 (3-5)之受信者欄位包含分配給有關行動台 (MS)之網際網路位址 (IA_{MS})。

9. 一種行動通信系統之網路元件，最好是短信息服務中心 (SMSC)之網路元件，它能配合支援一種通信協定，俾在一行動台 (MS)與一第二方 (B)之間，經由該網路元件 (SMSC)加以傳送信息，其特徵為，該網路元件可連接至網際網路且該通信協定包含：

・一項對虛擬號碼之分配請求 (2-1，2-3)，此分配請求是由行動台 (MS)加以傳送，且為了要分配一虛擬號碼 (VN)給一項組合 (14_1)，此項組合至少包含由分配請求所表示之一第二方 (B)之一位址 (IA_B)；

・針對虛擬號碼分配請求之一回覆 (2-2， 2-4)，此回覆被加以傳送至行動台 (MS)，此回覆表示虛擬號碼之保留是否成功，且如果成功，則分配虛擬號碼。

10.如申請專利範圍第 9項之網路元件，其特徵為，為了支援從行動台 (MS)至第二方 (B)之信息通信流量，通信協定更含：

・一由行動台 (MS)所傳送之第一短信息 (2-9 ， 2-15)，此短信息以虛擬號碼 (VN)當作其位址並包含一第一文字部分；以及

・一第一電子郵件信息 (2-10， 3-4)，此電子郵件信息是為了由遠架一 短信息並被加以傳送至第二方 (B)，該第一電子郵件信息包含：

・・一送信者欄位，此欄位表示該網路元件 (SMSC)並至少間接表示有關之行動台 (MS)；

・一受信者欄位與該分配請求 (2-1， 2-3)，此欄位對第二方 (B)表示受信者位址 (IA_B)是根據虛擬號碼 (VN)加以決定，而虛擬號碼 (VN)為第一短信息 (2-9， 2-15)之位址；

・・一文字部分，此文字部分實質上等於第一短信息 (2-9， 2-15)之文字部分。

11.如申請專利範圍第 10項之網路元件，其特徵為，為了支援從第二方 (B)至行動台 (MS)之信息通信流量，通信協定更包含：

・一第二電子郵件信息 (2-11， 3-5)，包含：

・・一送信者欄位，此欄位表示第二方 (B)；

・・一受信者欄位，此欄位表示該網路元件 (SMSC)與至少間接表示行動台 (MS)；以及

・・一第二文字部分；以及

・・第二短信息 (2-12)，根據第二電子郵件信息 (2-11； 3-5)之受信者欄位中與該分配請求 (2-1， 2-3)中所包含之資訊加以決定此短信息之接收行動台 (MS)；該第二短信息實質上包含該第二文字部分且最好也包含分配給該組合 (14_i)之虛擬號碼 (VN)。

12.如申請專利範圍第 10項之網路元件 (SMSC)，其特徵為，第一電子郵件信息 (2-10) 之送信者欄位包含第一短信息 (2-9)位址之虛擬號碼 (VN)。

13.如申請專利範圍第 11項之網路元件 (SMSC)，其特徵為，通信協定更含：

・一第二分配請求 (3-1)，此分配請求由行動台 (MS)加以傳送，用以分配一網際網路位址 (IA_{MS}) 給該行動台 (MS)；以及

・一針對第二分配請求，並加以傳送至行動台 (MS)之回覆 (3-2)，此回覆表示網際網路位址之分配是否成功；以且

・第一電子郵件信息 (3-4)之送信者欄位與第二電子郵件信息 (3-5)之受信者欄位包含分配給該行動台 (MS)之網際網路位址 (IA_{MS})。

14.如申請專利範圍第 9至 13項中任一項之網路元件 (SMSC)，其特徵為，該組合 (14_i)也包含傳送分配請求之行動台 (MS)之識別記號。

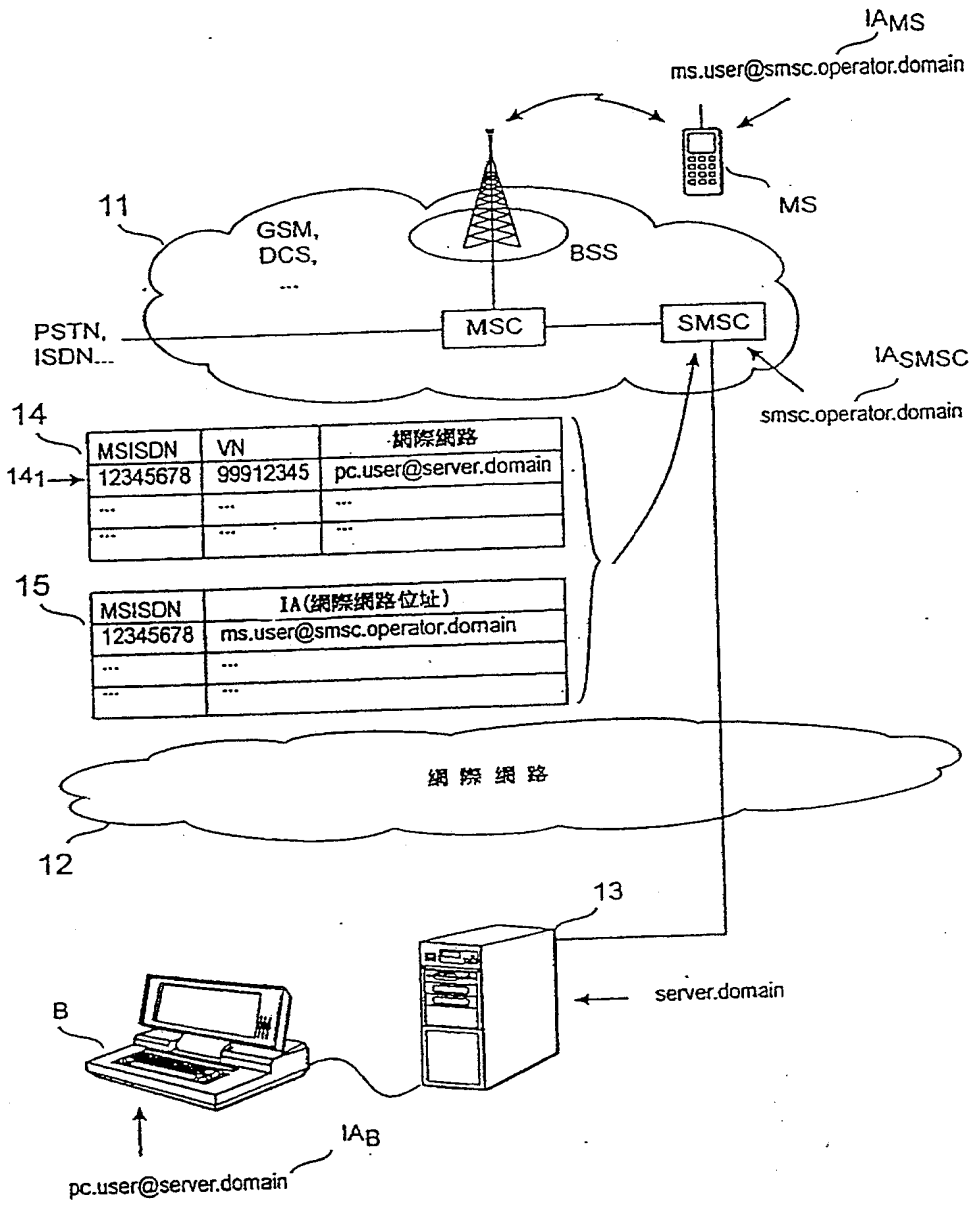
15.如申請專利範圍第 9至 13項中任一項之網路元件 (SMSC)，其特徵為，它是一種適當延伸之短信息服務中心。

16.如申請專利範圍第 9至 13項中任一項之網路元件 (SMSC)，其特徵為，它包含一本身已知之短信息服務中心以及全功能上為附接在它上面之一分開延伸部分。

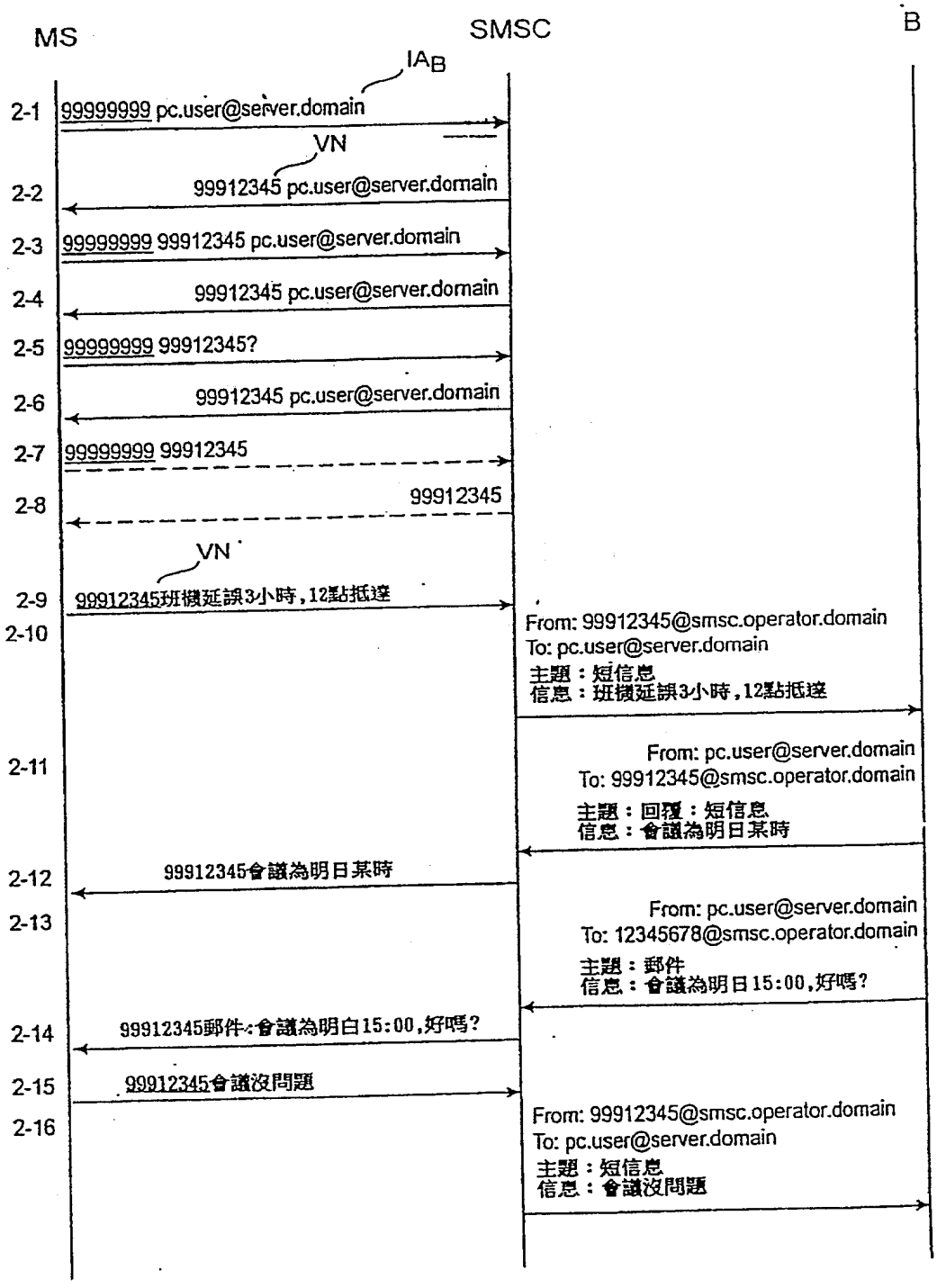
圖式簡單說明：

第一圖表示一電信系統圖以及本發明一短信息服務中心內所包含之表格；以及

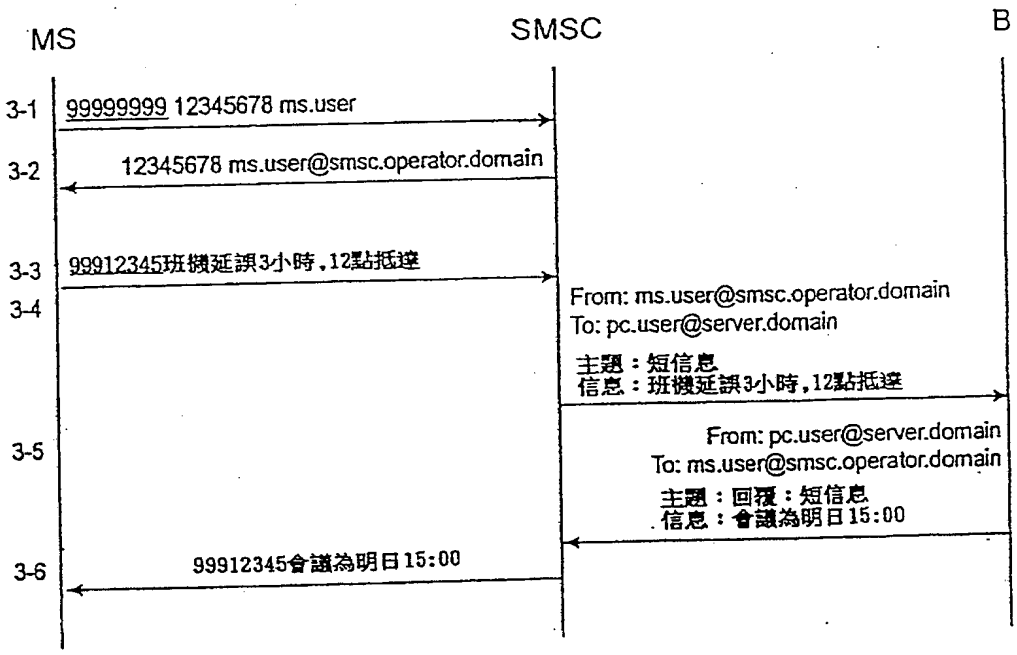
第二圖和第三圖表示根據本發明在一行動台與一 B方之間之電子郵件的傳送。


IAMS
ms.user@smsc.operator.domain
MS
11
GSM,
DCS,
...
BSS
PSTN,
ISDN...
MSC
SMSC
IASMSC
smsc.operator.domain
14
141
MSISDN
VN
網際網路
12345678
99912345
pc.user@server.domain
15
MSISDN
IA(網際網路位址)
12345678
ms.user@smsc.operator.domain
網 際 網 路
12
13
server.domain
B
IAB
pc.user@server.domain

第一圖


MS
SMSC
B
IAB
2-1 99999999 pc.user@server.domain
VN
2-2 99912345 pc.user@server.domain
2-3 99999999 99912345 pc.user@server.domain
2-4 99912345 pc.user@server.domain
2-5 99999999 99912345?
2-6 99912345 pc.user@server.domain
2-7 99999999 99912345
2-8 99912345
VN
2-9 99912345班機延誤3小時,12點抵達
2-10 From: 99912345@smsc.operator.domain
To: pc.user@server.domain
主題：短信息
信息：班機延誤3小時,12點抵達
2-11 From: pc.user@server.domain
To: 99912345@smsc.operator.domain
主題：回覆：短信息
信息：會議為明日某時
2-12 99912345會議為明日某時
2-13 From: pc.user@server.domain
To: 12345678@smsc.operator.domain
主題：郵件
信息：會議為明日15:00,好嗎?
2-14 99912345郵件:會議為明白15:00,好嗎?
2-15 99912345會議沒問題
2-16 From: 99912345@smsc.operator.domain
To: pc.user@server.domain
主題：短信息
信息：會議沒問題

第二圖


MS
SMSC
B
3-1
99999999 12345678 ms.user
3-2
12345678 ms.user@smsc.operator.domain
3-3
99912345班機延誤3小時，12點抵達
3-4
From: ms.user@smsc.operator.domain
To: pc.user@server.domain
主題：短信息
信息：班機延誤3小時，12點抵達
3-5
From: pc.user@server.domain
To: ms.user@smsc.operator.domain
主題：回覆：短信息
信息：會議為明日15:00
3-6
99912345會議為明日15:00

第三圖